CLAIMS

What is claimed is:

1. A coated article comprising a substrate and a wear-resistant coating, wherein the wear-resistant coating comprises a metal, ceramic or vitreous matrix material and superabrasive particles having a protective metallic coating, wherein the coated superabrasive particles are co-deposited within the matrix material.

2. The coated article of claim 1, wherein the matrix material is selected from the group consisting of nickel, cobalt, iron, chromium, tungsten, molybdenum, carbides, borides, nitrides, oxides, intermetallics, and mixtures thereof.

3. The coated article of claim 1 wherein the superabrasive particles are made of cubic boron nitride, diamond or a mixture thereof.

4. The coated article of claim 1, wherein the protective metallic coating is a metal selected from the group consisting of aluminum, silicon, scandium, titanium, vanadium, chromium, yttrium, zirconium, niobium, molybdenum, hafnium, tantalum, tungsten, rhenium, the rare earth metals, and a mixture thereof.

5. The coated article of claim 1, wherein the substrate comprises a material selected from the group consisting of metals, metal alloys, organic resins, metal-based materials, polymeric materials and mixtures thereof.

6. The coated article of claim 1, wherein the substrate comprises an organic resin containing a reinforcing component.

7. The coated article of claim 1, wherein the wear-resistant coating is applied onto said substrate in the form of a powder, slurry, paste, tape, or foil.

8. The coated article of claim 1, wherein the wear-resistant coating composition is applied to the substrate by a process selected from the group consisting of thermal sprays, heat treatments, PVD techniques, CVD techniques, anodizing, electroplating, HVOF, and brazing.

9. The coated article of claim 1, wherein the coated superabrasive particles are less than about 50 μm in size.

10. The coated article of claim 1, wherein the protective metallic coating is a refractory material having the formula MC_xN_y, wherein M is a metal, C is carbon having a first stoichiometric coefficient x, and N is nitrogen having a second stoichiometric coefficient y, and wherein $0 \leq x$ and $y \leq 2$.

11. The coated article of claim 1, wherein the wear-resistant coating further comprises finely divided insoluble or sparingly soluble particulate matter.

12. The coated article of claim 1, wherein the wear-resistant coating has a thickness of up to about 1000 μm.

13. The coated article of claim 1, wherein the protective coating chemically bonds to the superabrasive particles.

14. The coated article of claim 1, wherein the protective coating chemically bonds to the metal, ceramic or vitreous matrix material.

15. The coated article of claim 1, wherein the coated superabrasive particles are distributed uniformly within the wear-resistant coating.

16. A method of providing a wear-resistant coating to a substrate comprising:

preparing a surface of the substrate; and

depositing a protective wear-resistant coating onto the surface of the substrate, wherein the wear-resistant coating comprises superabrasive particles having a protective metallic coating and wherein the coated superabrasive particles are co-deposited onto the substrate within a metal, ceramic, or vitreous matrix material.

17. The method of claim 16, wherein the matrix material is selected from the group consisting of nickel, cobalt, iron, chromium, tungsten, molybdenum, carbides, borides, nitrides, oxides, intermetallics, and mixtures thereof.

18. The method of claim 16, wherein the preparation step comprises texturing the surface of the substrate.

19. The method of claim 16, wherein the wear-resistant coating is deposited at a process temperature above about 500°F.

20. The method of claim 16, wherein the wear-resistant coating is deposited using a process selected from the group consisting of thermal sprays, heat treatments, PVD techniques, CVD techniques, anodizing, electroplating, HVOF, and brazing.

21. The method of claim 16, wherein the superabrasive particles are made of cubic boron nitride, diamond or a mixture thereof.

22. The method of claim 16, wherein the protective metallic coating comprises a metal selected from the group consisting of aluminum, silicon, scandium, titanium, vanadium, chromium, yttrium, zirconium, niobium, molybdenum, hafnium, tantalum, tungsten, rhenium, the rare earth metals, and mixtures thereof.

23. The method of claim 16, wherein the substrate comprises a material selected from the group consisting of metals, metal alloys, organic resins, metal-based materials, and polymeric materials and mixtures thereof.

24. The method of claim 16, wherein the wear-resistant coating is applied onto said substrate in the form of a powder, slurry, paste, tape, or foil.

25. The method of claim 16, wherein the protective metallic coating is a refractory material having the formula MC_xN_y, wherein M is a metal, C is carbon having a first stoichiometric coefficient x, and N is nitrogen having a second stoichiometric coefficient y, and wherein $0 \leq x$ and $y \leq 2$.

26. The method of claim 16, wherein the protective coating chemically bonds to the superabrasive particles.

27. The method of claim 16, wherein the protective coating chemically bonds to the matrix material.

28. The method of claim 16, wherein the coated superabrasive particles are distributed uniformly within the wear-resistant coating.